

Remarks

Regarding the Amendments

The amendment to Claim 1 is based on the specification at page 4, lines 6 through 9 and therefore adds no new matter.

The amendment to Claim 4 is based on the pultrusion process as described in Claim 1 and therefore adds no new matter.

The amendment to Claim 11 is based on the specification at page 9, lines 4 through 7, and therefore adds no new matter.

Responsive to the Rejections

As described in more detail in the application, the present invention provides a pultrusion process with in-line forming that produces articles or parts that are three dimensional in that they are curved, twisted or provided with a varied cross sectional shape along their length. This has not been possible with the pultrusion processes as shown in the prior art that provide a two dimensional, linear profile.

Claims 4 and 11 are rejected under 35 USC § 112 as being indefinite. It is believed that the amendments to Claims 4 and 11 overcome those rejections of those claims and utilize claim language that is clearly supported in the application as filed.

Claim 1 currently stands rejected under 35 USC §102(b) on the basis of the pultrusion process taught in USP 3,993,726 to Moyer ("Moyer"). Moyer teaches a pultrusion process where a continuous fiber composite is compressed and shaped to reduce the voids and provide a smooth, dense, *uniform* rod or tube or other shape. See col. 2, lines 21 - 22. It is emphasized that the product is "*uniformly dimensioned*" along its length. See col. 2, lines 38 - 39. This is in direct contrast to the present invention which provides a non-uniform part or article that is is twisted, curved or has some other sort of variation along its length dimension. There is clearly no suggestion in Moyer to add steps or operations that would result in a process with the claimed features of Applicants' process to produce non-uniform parts that were twisted, curved or have some other sort of variation along the length dimension.

Claims 2 through 11 currently stand rejected under 35 USC §103(a) on the basis of Moyer in view of a number of secondary references that allegedly make the specific features of Applicants' dependant claims obvious. It is first noted that process of Moyer is not taught nor suggested to have in-line forming features that are required in Applicants' claimed process to provide non-uniform pultruded articles. Therefore, it clearly would not be suggested or obvious to add or combine features

with the Moyer teachings that would provide such a process *except* in hindsight with the benefit of Applicant's disclosure. As will be discussed for the further secondary references, none make any further teaching or suggestion that would make Applicants' claimed process for in-line forming of a thermoplastic composite obvious (or even obvious to try) from the process for extrusion of uniform profile extrusion according to Moyer.

In particular, USP 5,614,228 to Demerest is cited in rejecting Claim 2. While the PET thermoplastic resins used in the multi-step thermoforming process of Demerest may have Tg values greater than 50°C, PET is not a depolymerizable and repolymerizable thermoplastic resin as required in Claim 2. It is further maintained that Demerest has absolutely no relevance to an in-line forming pultrusion process.

Claim 3 is rejected on the basis of Moyer and Demerest in further view of USP 5,798,067 to Long showing the use of a rotary die with a composite. Long, however, emphasizes curable thermoset resin composites and particularly the shaping of a partially cured thermosetting resin followed by heating that completes the curing. This reference, therefore, does not suggest a process that thermoforms thermoplastic articles in-line.

Claim 4 is rejected on the basis of Moyer and Demerest in further view of USP 5,891,379 to Bhattachayya showing the roll forming of fiber reinforced composites. Bhattachayya does not teach or suggest any combination of pultrusion of continuous fiber compositions with in-line roll forming and does not thermoform the article into a non-uniform part or article that is twisted, curved or has some other sort of variation along its length.

USP 6,086,800 to Manlove, is applied with Moyer and Demerest in rejection of Claim 5 but offers no teaching of a continuous fiber pultrusion process or any steps that would provide in-line forming with such a process. It is therefore clear that this combination cannot suggest or make obvious in any way Applicants' claimed invention.

Claims 6 and 7 are rejected on the basis of Moyer and Demerest in further view of USP 6,256,146 to Merrill showing a second step, post forming of composites. Since Merrill does not suggest use of or application to continuous fiber pultrusions and does not thermoform the article into a non-uniform part or article that is twisted, curved or has some other sort of variation along its length; Applicants' claimed invention is not suggested in any way.

USP 5,591,463 to Padovani, is applied with Moyer and Demerest in rejection of Claim 8 but shows only the thermoforming of shaped articles from sheet. Since Padovani offers no teaching that can be combined with a continuous fiber pultrusion process or any steps that would provide in-line forming with such a process, it is clear that this combination cannot suggest or make obvious in any way Applicants' claimed invention.

Claims 9 and 10 are rejected on the basis of Moyer and Demerest in further view of USP 4,058,581 to Park. Park uses a completely different solution coating process for providing thermoplastic composites but is cited for its alleged teaching that polyurethane is suited for this application. A more careful reading of Park, however, shows that this reference teaches a range of resins that does not include polyurethane (see col. 3, lines 15 through 20 and lines 62 through 68). Park actually appears to indicate that polyurethane would not be suited for use in the composites that are shown. Since Park clearly does not teach or suggest either a continuous fiber pultrusion process of the type Applicants claim or a process where the product article is thermoformed into a non-uniform part or article that is twisted, curved or otherwise varied along its length; Applicants' claimed invention is not suggested in any way by any combination of Park with any other cited references.


Claim 11 is rejected on the basis of Moyer and Demerest in further view of USP 5,433,419 to Murakami which teaches the use of a range of resins in a pultrusion process, some of the resins being taught and claimed for use in the present invention. Like Moyer, however, Murakami teaches a pultrusion process where a continuous fiber composite is compressed and passed through a shaping die to provide a uniform strand, rod, ribbon, tape, sheet or tube or other like shape. See col. 3, lines 25 - 30. Regardless of the resins it teaches, this only teaches a process where the product is uniformly dimensioned along its length. This is in direct contrast to the present invention which provides a non-uniform part or article that is twisted, curved or has some other sort of variation along its length dimension. There is clearly no suggestion to combine these references in any way to add steps or operations that would result in a process with the claimed features of Applicants' process to produce non-uniform parts that were twisted, curved or have some other sort of variation along the length dimension.

Claim 1 currently stands rejected under the doctrine of obviousness-type double patenting on the basis of the pultrusion process taught in USP 5,891,560 to Edwards ("Edwards"). Like Moyer (discussed above), Edwards teaches a pultrusion process where a continuous fiber composite is shaped to provide a smooth, uniform profile. This is in direct contrast to the process of the present invention, however, which includes an in-line forming step that provides a non-uniform part or article that is twisted, curved or has some other sort of variation along its length dimension. There is clearly no suggestion in Edwards to add steps or operations that would result in a process with the claimed features of Applicants' process to produce non-uniform parts that were twisted, curved or have some other sort of variation along the length dimension. Moreover, as already discussed in more detail above, the secondary references offer no further teachings that would make obvious in any way Applicants' claimed process aspects in the dependant claims.

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As discussed above, Applicants' claimed invention, as amended, is not taught or suggested by the cited prior art. It is therefore courteously requested that a Notice of Allowance be promptly issued for these claims.

Respectfully submitted,


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